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ABSTRACT

This booklet is intended to increase the awareness of persons working in long-term care facilities regarding the danger of infectious disease and the ways in which it can be spread. Materials in this booklet include: (1) a brief discussion of historical events in the study of microorganisms; (2) information about how microorganisms cause infection and how they are transferred from one person to another; (3) suggestions for ways health care professionals can reduce the spread of infection; (4) information about handwashing, care and cleaning of equipment, antiseptics, and disinfectants; and (5) a worksheet which can be used to test the learning of the information. (DC)

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INFECTION CONTROL in the LONG TERM CARE FACILITY

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Instructor Information

This material is intended for use in inservice or continuing education for persons who work in long term care. It includes:

1. a brief discussion of historical events in the study of microorganisms.
2. information about how microorganisms cause infection and how they are transferred from one person to another.
3. suggestions for ways health care personnel can help to reduce the spread of infection.
4. information about antiseptics and disinfectants.
5. a worksheet which can be used to evaluate learning.

Audiovisual Material

The following filmstrip is available on loan from Vocational Education Services:

Medical Asepsis (AV070050)—Explains what germs are, how they grow and multiply, are transported, and enter the body. Demonstrates how to control the growth and spread of microorganisms.

Suggested Resources

Center for Disease Control, Department of Health and Human Services, Atlanta, Georgia 30333.

Infection Control in the Long Term Care Facility

Goal

When large numbers of people live and work close to each other, the possibility of transfer of infectious disease from one to another is great. In the long term care facility the danger is increased. Many residents are there due to illnesses which have lowered their resistance to infection. Others may have infectious diseases which, without proper care, could be transferred to another resident or a staff member. Awareness of the danger of infectious disease and the ways in which infections can be spread is essential for all personnel. Knowledge and conscientious practice of patient care techniques which prevent and control the spread of infection will contribute to the physical well being of both residents and staff members.

Objectives

After completing this inservice program, the participant will be able to:

- Define microorganism.
- List three conditions which are necessary for microorganisms to grow and multiply.
- List four ways microorganisms might be transferred from one place to another.
- List six routes through which microorganisms might enter the body.
- Describe six ways health care personnel might help to reduce the spread of infection.
- Name seven patient care situations when hand washing is necessary.
- Describe good handwashing technique.
- Describe an effective procedure for cleaning reusable equipment such as wheelchairs.
- Describe an effective procedure for cleaning thermometers.
- Describe an effective procedure for cleaning bedpans and urinals.
- List four conditions which will help to prevent a urinary tract infection in the resident with a catheter.

General Information

Anton van Leeuwenhoek, in 1687, first described tiny organisms which he saw in a drop of water he was observing with a magnifying glass. Until that time, man had no idea that organisms which could not be seen with the naked eye existed. Over a period of years, more powerful and accurate microscopes were made and scientists continued to study these small organisms, called microbes or microorganisms because they could only be seen through a microscope. Louis Pasteur, in the mid 1800's discovered that the spoilage of wine (when it turned to vinegar) was caused by the presence of millions of microorganisms. He developed the process of pasteurization, heating the wine to destroy the microorganisms, and thus prevented spoilage. He then found that microorganisms caused some diseases in animals and people the same as they caused disease (spoilage) in wine. The discovery that disease-producing microorganisms could be transmitted from person to another pointed out the need for infection control.

Lord Joseph Lister, after studying the work of Pasteur, applied this knowledge to his work as a surgeon. He sterilized his instruments by boiling and used antiseptic sprays to decrease the danger of infection in the operating room. These were the beginnings of knowledge about the cause of infectious disease; a growing knowledge which has made life safer and more pleasant for mankind.

Microorganisms, also called microbes or germs, are tiny living plants and animals that cannot be seen without a microscope. Most microorganisms are harmless to man. Many are even helpful. An example of helpful microorganisms are those which live in the stomach and intestines where they aid in the digestion of food. Disease producing microorganisms are called pathogens. It is these pathogenic microorganisms which concern us in the health care facility. We wish to prevent their contact with patients and personnel and thus decrease the possibility of disease.

There are several types of microorganisms. They are classified according to appearance and behavior. Yeasts, molds, protozoa, bacteria, parasites, and viruses are terms which describe different types of microorganisms. Some microorganisms in each of these classifications are pathogens and some are not.

Pathogenic organisms cause disease in different ways but generally they damage the body of the host (person, animal, or plant in which they live and grow) as they go about their own living processes. They use the host's cells for food and oxygen, and their excretions may be damaging (toxic) to the host's cells. As they multiply, the damage they cause to the host increases.

In order to grow and multiply, microorganisms need food and water. Most, but not all, need oxygen. Microorganisms grow best in a warm, dark place. A bedpan, carelessly washed and placed in a bedside table provides the best possible conditions for growth of pathogenic microorganisms. Wet, soiled clothing or linen containing body discharges such as saliva and urine offer another perfect environment for disease producing germs to grow and wait for a human host. Body cavities such as the mouth, intestinal tract, and vagina or broken areas in the skin are warm, moist areas in which organisms can grow if they somehow find their way there.

Disease producing microorganisms can be passed from one person to another in four ways. Organisms that are present in one person's mouth, nose, or throat, for example, can be transmitted to another through the air by a cough or a sneeze. They might also be transmitted by touch as the uninfected person touches the nose or mouth of the infected person and then touches his/her own. Linen, clothing, dishes, or a thermometer might contain disease producing organisms which could be picked up on the hands of a well person and transferred to his/her own mouth or nose by a simple touch of hand to face. Pathogens might also be transferred from one person to another by a third person's contaminated hands or clothing. This is a special danger in a health care facility if personnel are careless about cleanliness as they move from one resident to another.

Organisms can enter a person's body through any orifice and through broken areas in the skin. The intact skin is resistant to all but the most virulent organisms. Intact mucous membranes are resistant to many organisms but are more susceptible to infection than the unbroken skin.

Points to remember

- Microorganisms require food and moisture.
- Most microorganisms grow best in a dark, warm place.
- Most microorganisms require oxygen.
- Microorganisms might be transferred from one place to another
 - a. through the air (as in coughing or sneezing).
 - b. through physical contact with an infected person.
 - c. through contaminated items such as soiled linen, thermometers, dishes, etc.
 - d. by another person (dirty hands, uniform, etc.).
- Microorganisms may enter the body through
 - a. the mouth and nose.
 - b. the ear and eye.
 - c. the rectum.
 - d. the urethra.
 - e. the vagina.
 - f. a broken area in the skin.

Using this information, we can plan specific ways to prevent the spread of infection:

Prevent the spread of infection through the air by:

using and encouraging residents to use tissues when coughing or sneezing.

keeping surroundings clean and dust free.

handling soiled linen and clothing carefully, without shaking.

Prevent the spread of infection through physical contact by:

maintaining your own good health, not working when you have a contagious disease such as a cold or skin infection.

washing your hands carefully after using the bathroom or blowing your nose.

washing your hands before serving food and between patients.

keeping the patient clean; encouraging him/her to wash his/her hands before meals and after using the toilet.

Prevent the spread of infection through contaminated articles by:

careful handling of linen—avoid touching your uniform with soiled linen; bundle it; don't put it on the floor.

immediately disposing of body discharges such as feces, vomitus, urine, sputum.

washing articles such as bedpans, urinals, bathpans carefully and sterilizing them according to facility policy.

keeping water pitchers and glasses clean.

cleaning and sterilizing thermometers after every use.

careful handling of soiled dressings which may contain pathogenic organisms.

frequent cleaning of commonly used items such as wheel chairs.

keeping dirty and clean items separated.

providing good catheter care according to facility policy.

Personal grooming for staff members is an important part of infection control both in protecting one's self from infection and in protecting the patient. Good grooming includes:

- a. being clean; bathing daily, washing hands frequently while working.
- b. wearing a clean uniform and clean shoes; removing your uniform when you leave work to protect your family and others.
- c. keeping nails short and clean.
- d. keeping hair clean and styled to prevent contact with the patient.

Handwashing

Handwashing is generally considered to be the most important single procedure for preventing the spread of infection.

Health care personnel are frequently found to transmit pathogenic organisms (and thus infection) from one patient to another on their hands. Frequent handwashing which removes organisms is an important means of preventing infection.

Guidelines developed by the National Center for Disease Control advise that hands should be washed:

1. before and after prolonged and intense patient contact (such as bathing, turning, changing bed, etc.).
2. before invasive procedures (such as catheterization and suctioning) whether or not sterile gloves are worn.
3. before and after contact with wounds.
4. after contact with a person or object that is likely to be contaminated.

5. before contact with particularly susceptible patients.
6. as a part of personal hygiene.
7. any time the health worker is in doubt about the necessity.

The guidelines also state that handwashing is not required following:

1. most routine activities involving indirect contact such as administering medications.
2. most routine activities involving brief, direct, patient contact such as taking a blood pressure or TPR.

Handwashing techniques recommended by the Center for Disease Control vary according to the reason for washing. For routine patient care they advise a vigorous washing for at least 10 seconds under running water. Hands should then be dried on a disposable towel. The water faucet should be turned off with a paper towel rather than with the clean hand since this is a possible means of recontamination. Bar soap, liquid soap, granule soap, or soap-impregnated tissues should be used. Because liquid soap containers and bar soap left in a pool of water can become contaminated and harbor microorganisms, it is important to clean soap containers regularly and place bar soap on racks that allow water to drain.

Antiseptic (antimicrobial) products should be used for handwashing following care of the patient in respiratory or enteric isolation or with an infected wound; any time the hands are possibly contaminated with virulent organisms. Hand jewelry should be removed and nails cleaned under these circumstances because microorganisms may remain here. Chlorhexidine, hexachlorophene, iodophors, and alcohol are the recommended active antimicrobial agents in handwashing products. Hexachlorophene, however, should not be used in the routine bathing of infants or by pregnant women.

Care of Equipment

Cleaning and disinfection of equipment is an important factor in infection control. Any microorganisms which come in contact with normally sterile tissues can cause infection. For this reason, catheters, dressings, syringes, and needles are purchased sterilized and not reused. It is important that the packaging be intact on these items to insure *sterility* (absence of all forms of microbial life).

Intact skin acts as an effective barrier to all but the most virulent organisms so it is not critical that items which touch only intact skin be sterile. Reusable equipment such as wheelchairs, crutches, heat lamps, and bedside utensils should be thoroughly cleaned and disinfected on a regular basis. An effective procedure would include: 1. washing with a

detergent or disinfectant-detergent combination, 2. rinsing, and 3. thorough drying. Generally, cleaning is designed to remove microorganisms rather than kill them. It is important to remember that organic material harbors organisms and protects them from the action of disinfectants or antiseptics.

Items such as thermometers, dishes, silverware, urinals, bedpans, and emesis basins are more likely to accumulate pathogenic organisms from body discharges so require frequent cleaning and disinfection. A thermometer should be rinsed in cold water, washed with soap to remove organic matter and then soaked in disinfectant before being used by a different person. If a thermometer is to be retained at the bedside, it should be rinsed, washed with soap, and stored in a thermometer case containing 70% alcohol or dried and stored in a dry thermometer case.

Following use, bedpans, urinals, and emesis basins should be emptied, thoroughly cleaned with soapy water or disinfectant solution and rinsed under running water. If these items are to be returned to the same person, they should be dried with a paper towel before being returned to the bedside. If they are to be used by another person, they should be sterilized in a steam sterilizer, immersed in hot water 170°F for at least 30 seconds or immersed in a disinfectant solution according to the directions for that solution. Many facilities use appliances similar to dishwashers which operate with a water temperature of 170°. Utensils which are returned to the same patient need not be sterilized after each use but it is important to sterilize them on a regular basis, such as weekly. Any time you question whether something should be sterilized, it probably should! Remember that disinfection cannot be accomplished in the presence of organic material such as blood, feces, and sputum. The first step in disinfection is thorough cleaning.

Special Risks

Residents with indwelling catheters are under high risk of developing urinary tract infections. Careful handling of the drainage system can lessen the risk. Catheters should be used only when necessary for the resident's well being. Personnel should wash their hands very carefully before handling the catheter or drainage system. The catheter should be secured to the leg with tape or an elastic leg band designed for that purpose. The catheter and drainage bag should not be disconnected unless irrigation is ordered. If the catheter is disconnected, both catheter opening and drainage tube opening should be cleaned with an alcohol swab before reconnection. Unobstructed flow should be maintained by keeping the tubing unkinked, keeping the drainage bag below the level of the catheter,

and emptying the bag regularly. It is very important that the catheter and the area around the urinary meatus be kept clean. The most commonly used practices are frequent cleansing with soap and water or povidone - iodine solution followed by application of povidone - iodine ointment. The effectiveness of these programs has not been proved.

Summary

Nursing homes are high risk areas for the spread of infection because of the high number of people living and working in a small space. There is added danger since many residents are there because they are ill and have less resistance to disease. The key to the prevention of infection is cleanliness of patients, personnel, furniture, and equipment. If residents develop infectious diseases, good nursing care practices can prevent the spread to others in the health facility. Likewise, careful personal care protects staff members and their families.

Vocabulary

Increase your vocabulary by learning the following terms.

microorganism - a tiny living plant or animal which can only be seen with a microscope

pathogenic - disease producing

contaminate - to make impure; to soil or infect

sterile - free from all microorganisms

infection - the successful invasion, establishment, and growth of microorganisms in the body of a host which produce symptoms of disease

virulent - highly infectious

clean - free from disease producing organisms

Antiseptics and Disinfectants

Antiseptics: Inhibit growth of microorganisms

Disinfectants: Destroy microorganisms

Name	Use	Activity	Points to Remember
alcohol Alcohol Ethanol	skin, equipment, medication vials, handwashing	disinfectant, germicidal, except ineffective against viruses, My- cobacterium, tuberculosis & sporeformers, rapid action	• optimal strength 70-90% • inactivated by protein • drying unless combined with emollients such as glycerine • minimum skin exposure to alcohol for effective action is 2 minutes
chlorhexidine Hibiclens Hibitane	handwashing, wound cleansing	disinfectant, bactericidal, residual action, broad spectrum action, moderate speed of action	• non-irritating • rinse skin after use but do not use alcohol • do not use in eyes or ears
hexachlorophene PHisoHex Hexamead-Ph Septsoft Wesco Hex	skin, handwashing	antiseptic, bacteriostatic to gram-positive organisms, requires repeated use to be effective, slow action	• may be absorbed through the skin and cause neurotoxicity • rinse skin following use but do not use alcohol
povidone - iodine Betadine Iodine Providine Bridine	skin, surface wounds, mucous membranes, handwashing	disinfectant, germicidal, effective against gram-negative and gram-positive bacteria, somewhat effective against Mycobacterium tuberculosis, rapid action	• usually not irritating to skin or mucous membranes • may be used around urinary meatus of persons with catheters • effectiveness reduced if followed by alcohol wipe • may be toxic if used excessively

Antiseptics: Inhibit growth of microorganisms**Disinfectants: Destroy microorganisms**

Name	Use	Activity	Points to Remember
hydrogen peroxide 3-6% solution	skin, open wounds, mouthwash	disinfectant, germicidal	● protect from heat and light ● do not shake
benzalkonium chloride Zephiran Germicin Benasept	skin, mucous membranes, equipment such as thermometers and instruments	disinfectant, germicidal, not effective for Mycobacterium tuberculosis, limited effectiveness on viruses	● inactivated by soap ● use only in recommended strengths ● dilute with distilled or sterile water, do not use tap water or resin deionized water which may contain substances that reduce antibacterial potency ● not recommended for handwashing

Worksheet

1. A microorganism is:
 - a. a germ which causes disease.
 - b. a tiny plant or animal visible through a microscope.
 - c. a cell which lives in the absence of oxygen.
 - d. a substance used to sterilize instruments.
2. In order to grow and multiply microorganisms need:
 - 1.
 - 2.
 - 3.
3. An infection might be transferred from one resident to another by:
 - 1.
 - 2.
 - 3.
 - 4.
4. Disease producing microorganisms might enter the body through the:
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
5. List six ways you might help to reduce the spread of infection in your facility.
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
6. Proper handling of an indwelling catheter may help to reduce the possibility of infection for the resident. Four measures that are helpful are:
 - 1.
 - 2.
 - 3.
 - 4.

True-False (mark T or F)

- ____ 1. Bar soap can become contaminated with disease-producing organisms if it is left in a pool of water.
- ____ 2. Hands should be washed after touching a soiled bedpan.
- ____ 3. A sterile item has no microorganisms on it.
- ____ 4. Washing an item in water at a temperature of 120° will kill all pathogenic organisms.
- ____ 5. The presence of organic material such as feces or vomitus will interfere with disinfection.

Describe an effective way to wash your hands when you are doing routine patient care such as bathing and bedmaking.